

Revision of the Genus *Pandanus* Stickman, Part 29 New Papuan Species in the Section *Microstigma* Collected by C. E. Carr

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THE ISLAND of New Guinea has a large concentration of species of *Pandanus*, and it is evident that they have been only partly collected and studied. They occur in nearly all plant formations from sea level to 3300 meters altitude. The three species here described were collected by C. E. Carr in 1935. He attempted to cross the Owen Stanley Range, from south to north, but lost his life in the attempt.

Section *Microstigma*

Pandanus Carrii sp. nov. (sect. *Microstigma*)

Fig. 272

DIAGNOSIS HOLOTYPE: Arboriformis 5 m alta, radicibus trunco ramis syncarpioque incognitis, foliis 1.14 (+0.02-0.05?) m longis proxima basem 3.6 cm latis in medio 2.6 cm latis coriaceis supra viridibus infra pallidioribus U-sulcatis 2-plicatis in sectione mediali cum 49 nervis parallelis secundariis in quoque dimidio nervis tertiis nullis lamina anguste gladiata ex basi sensim in apice crasso subulato (apex deest) basi inermi pallida, ex 11-13 cm marginibus cum aculeis 2-2.5 mm longis 6-12 mm separatis arcuatis fragilibus subulatis valde adscendentibus pallidis vel cum apicibus rubris, in sectione mediali marginibus cum aculeis 1.7-2 mm longis 5-12 mm separatis subarcuatis subulatis gracilibus subadpressis adscendentibus apicibus rubris, midnervo infra inermi, in apice subulato marginibus cum crenati-serrulis 0.2-0.3 mm longis 2-5 mm separatis rubris, syncarpio viridi, drupis 7.7-7.8 cm longis 1.4-1.6 cm latis 1.1-1.4 cm crassis prismaticis 6-angulosis, pileo 13-17 mm alto deciduo laevi exlucido dimidio infero late obtuso 6-anguloso dimidio supero rostrato crasso, stigmate 6-7 mm longo late elliptico obliquo brunneo papilloso sulcato, endocarpio submediali 4.3 cm longo subcylindrico cuneato osseoso obscure brunneo lateribus lateralibus 0.7-1.5 mm crassis intra laevibus lucidis, mesocarpio extra endocarpium cum fibris et eis ad stigmatem convergentibus, exocarpio et mesocarpio mollior carnosio et in fructu delapso et in sicco nigro, mesocarpio apicali extra cum fibris longitudinalibus sed intra cum membranis, mesocarpio basali carnosio et in sicco valde contracto.

DIAGNOSIS OF HOLOTYPE: Tree-like, 5 m tall; roots, trunk, branches, and syncarp un-

known; leaves 1.14 (+0.02-0.05?) m long, 3.6 cm wide near the base, 2.6 cm wide at the middle, coriaceous, above green, below paler green, U-sulcate, 2-pleated, at midsection with 49 parallel secondary veins in each half, no tertiary cross veins, blade narrowly sword-shaped, tapering gradually from near the base into the stout subulate apex (the actual tip missing), the base pale, unarmed, beginning at 11-13 cm up the margins with prickles 2-2.5 mm long, 6-12 mm apart arcuate weak subulate, strongly ascending, wholly pale or with red tips; the nearby midrib below not visible; at midsection the margins with prickles 1.7-2 mm long, 5-12 mm apart, subarcuate slender subulate, almost appressed ascending, red-tipped; the midrib below unarmed; near the apex the margins with crenate-serrulations 0.2-0.3 mm long, 2-5 mm apart, red; those of the midrib below not observed; syncarp "green"; drupes 7.7-7.8 cm long, 1.4-1.6 cm wide, 1.1-1.4 cm thick, prismatic, 6-angled; pileus 13-17 mm high, deciduous, smooth, dull, the lower half forming the broadly obtuse base, this 6-angled, bearing a thick beak; stigma 6-7 mm long, broadly elliptic, oblique, brown, papillose, sulcate; endocarp submedian, 4.3 cm long, subcylindric, tapering downward, the apex arched, bony, dark brown, the lateral walls 0.7-1.5 mm thick, within smooth, shiny; mesocarp with thick fibers up the sides of the endocarp and bending in toward the stigma; exocarp and lateral mesocarp soft fleshy, and at maturity sloughing off and drying black; apical mesocarp with fibers up the sides and within partitioned by pale membranes and filaments; basal mesocarp fleshy and at maturity much shrunken.

HOLOTYPE: Papua, Koitaki (on track to Owen Stanley Mountains pass), open savannah land, 1,500 ft alt, 13. 5. 1935, C. E. Carr 12,274 (BM). Isotype (K)!

DISCUSSION: *P. Carrii* is a member of the section *Microstigma*, as is its closest relative, *P. Julianettii* Martelli, a species with drupes 9.5-

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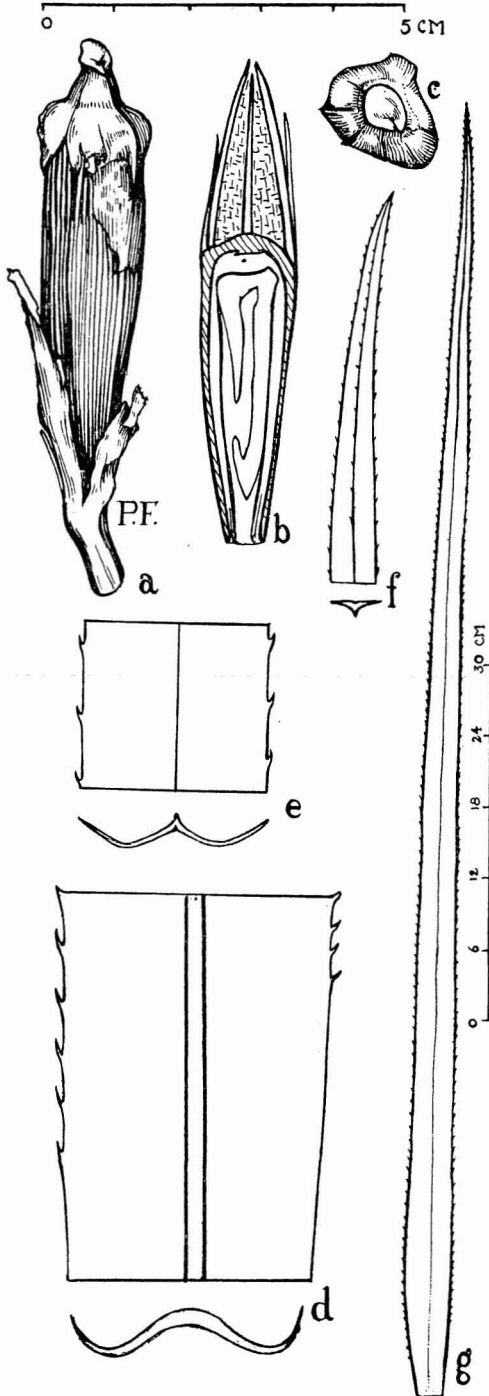


FIG. 272. *Pandanus Carrii* St. John, from the holotype. *a*, Drupe, lateral view, $\times 1$; *b*, drupe, longitudinal median section, $\times 1$; *c*, drupe, apical view, $\times 1$; *d*, leaf base, lower side, $\times 1$; *e*, leaf middle, lower side, $\times 1$; *f*, leaf apex, lower side, $\times 1$; *g*, leaf, upper side, $\times \frac{1}{6}$.

10 cm long; stigmas mostly excentric and sub-oblique; leaves 10 cm wide, and at midsection with 87 parallel secondary veins in each half, and there the margins with prickles 0.6–1 mm long, 3–7 mm apart, subulate, weak, counter-sunk in the margins, appressed ascending, yellowish. *P. Carrii* has the drupes 7.7–7.8 cm long; stigmas apical, oblique; leaves 3.6 cm wide, these at midsection with 49 parallel secondary veins in each half, and here the margins with prickles 1.7–2 mm long, 5–12 mm apart, subarcuate slender subulate, almost appressed ascending, red-tipped.

The species is named in honor of Cedric Eroll Carr (1892–1936) who made a notable collection in New Guinea. He crossed from Port Moresby over the Owen Stanley Range. Unfortunately, when approaching the north coast he sickened with black-water fever, and died there.

The specimen Carr 12,274 in the Arnold Arboretum herbarium is utterly different, an immature plant of the section *Pandanus*. There has been confusion in sorting and labelling it.

Pandanus erythros sp. nov. (sect. *Microstigma*)

Fig. 273

NOM. VERN.: "hadoro" (Biagi language); "kerei-kerei" (Motuan language).

DIAGNOSIS HOLOTYPE: Licet arbor, radicibus trunco ramis ignotis, foliis licet 2 m vel plus longis sed solum apice 51 cm longo preservato, eo subtiliter coriaceo supra viridi infra pallidiori V-sulcato 2-plicato in puncto 51 cm ex apice 8 cm lato et cum 63 nervis parallelis secundariis in quoque dimidio nervis tertiis nullis marginibus cum aculeis 0.4–1.3 mm longis 1–3 mm separatis subulatis rectis adpresse adscendentibus pallidis, midnervo proximo infra cum aculeis 0.4–0.8 mm longis 2–4 mm separatis arcuatis crassiter subulatis apicibus brunneis, in apice acuto marginibus cum subulato-serrulis 0.3–0.7 mm longis 0.5–2 mm separatis adscendentibus pallidis, midnervo infra cum aculeis 0.6–0.8 mm longis 3–5 mm separatis arcuatis subulatis adscendentibus pallidis, infructescencia cum syncarpio solitario, pedunculo 2.5 cm diametro 3-laterato bracteoso, syncarpio 22–27 cm longo 4.5–5 cm diametro subcylindrico obscure aurantiaco-rubro cum drupis numerosissimis eis 13–14.5 mm longis 2.5–2.8 mm latis 2–2.5 mm crassis anguste prismaticis 5–7-angulosis parte $\frac{1}{6}$ supera libera, pileo 3 mm alto pyramidalis, stigmatibus apicalibus et plerumque horizontalibus 1–1.2 mm lato cordato vel reniformi brun-

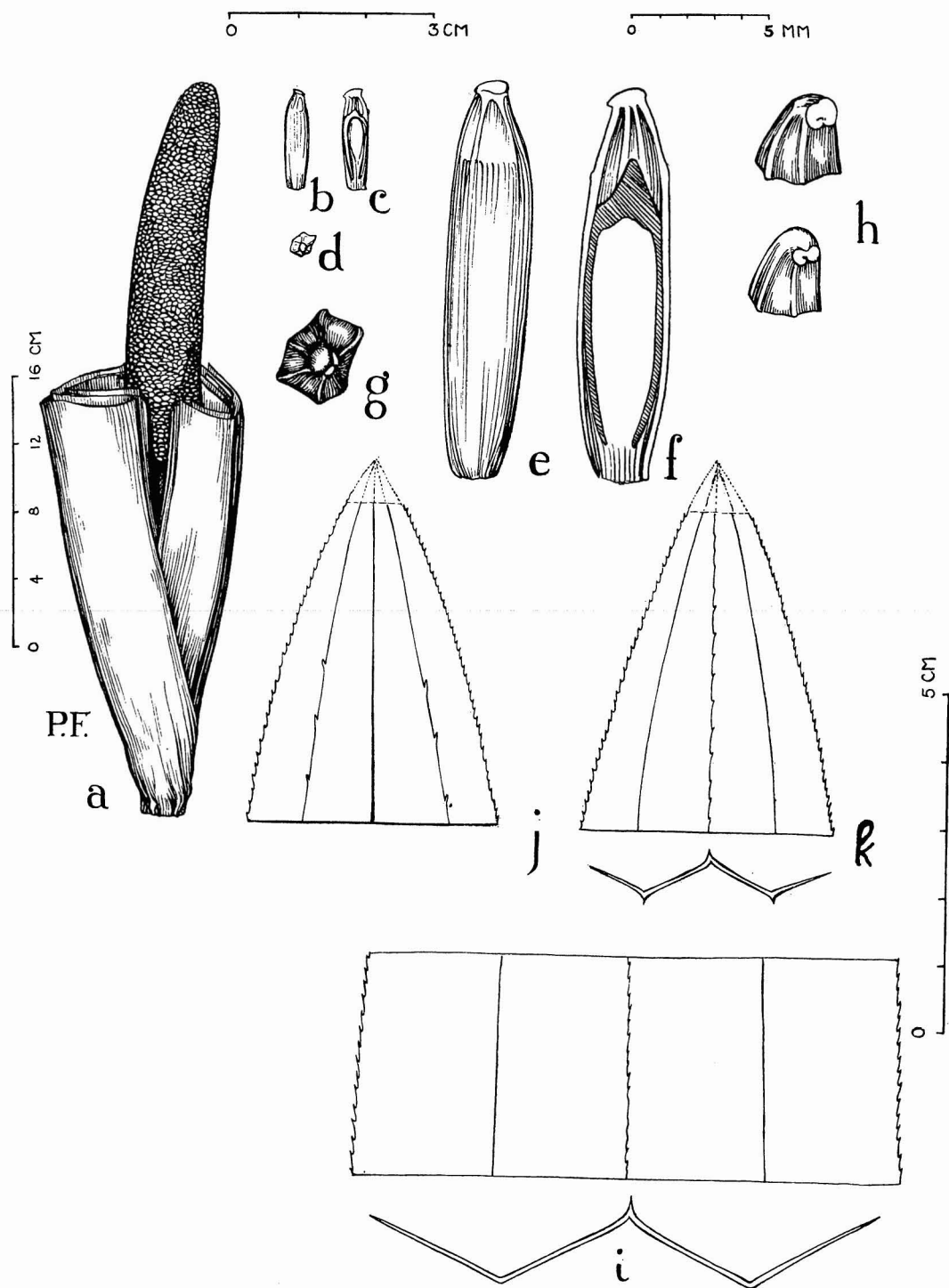


FIG. 273. *Pandanus erythros* St. John, from holotype. *a*, Syncarp and bracts, lateral view, $\times \frac{1}{4}$; *b*, apical drupe, lateral view, $\times 1$; *c*, apical drupe, longitudinal median section, $\times 1$; *d*, apical drupe, apical section, $\times 1$; *e*, apical drupe, lateral view, $\times 4$; *f*, apical drupe, longitudinal median section, $\times 4$; *g*, lower lateral drupe, apical view, $\times 4$; *h*, lower lateral drupes, lateral view of apex and stigma, $\times 4$; *i*, leaf section, 45 cm down from tip, lower side, $\times 1$; *j*, leaf apex, upper side, $\times 1$; *k*, leaf apex, lower side, $\times 1$.

neo papilloso sed aliquis inferis cum areola concava distali et cum stigmatibus oblatis-elliptico obliquo proximali, endocarpio submediali ellipsoideo apiculato osseoso palliditer brunneo lateribus lateralibus 0.2 mm crassis intra laevibus exlucidis, mesocarpio apicali fibroso et medullosa, mesocarpio basali fibroso et carnosum.

DIAGNOSIS OF HOLOTYPE: Probably a tree; habit not recorded; roots, trunk, and branches not collected; leaves probably two or more meters in length, but only a leaf tip 51 cm long preserved, this thin coriaceous, green above, paler green below, V-sulcate, 2-pleated, at the point 51 cm down 8 cm wide and with 63 parallel secondary veins in each half, no tertiary veins, and at the same point the margins with prickles 0.4–1.3 mm long, 1–3 mm apart, straight subulate, appressed ascending, pale; the nearby midrib below with prickles 0.4–0.8 mm long, 2–4 mm apart, arcuate stout subulate, brown tipped; on the acute apex the margins with arcuate subulate-serrulations 0.3–0.7 mm long, 0.5–2 mm apart, ascending, pale; the midrib below with prickles 0.6–0.8 mm long, 3–5 mm apart, arcuate stout subulate, ascending, pale; infructescence with a solitary syncarp; peduncle 2.5 cm in diameter, 3-sided, bracteate; syncarp completely enwrapped by 12–15 navicular bracts in 3 series and of all of these the lower part preserved, this 22–23 cm long, 9 cm wide, thick coriaceous, the margins with prickles 0.3–0.5 mm long, 1–2 mm apart, subulate, salient; the midrib below unarmed for some 15 cm; there are also two bract tips 45–50 cm long, but these are so different in thickness and structure that they appear like foliage bracts early in the developing spiral of leaves; syncarp 22–27 cm long 4.5–5 cm in diameter, subcylindric, dull orange-red, bearing multitudinous drupes, these 13–14.5 mm long, 2.5–2.8 mm wide, 2–2.5 mm thick, narrowly prismatic, 5–7-angled, upper $\frac{1}{5}$ free; pileus 3 mm high, pyramidal; stigma apical and horizontal on most drupes, 1–1.2 mm wide, cordate or reniform, brown, papillose, but some of the lower drupes with an apical concave platform and the stigma oblate elliptic on the proximal oblique face; endocarp submedian, ellipsoid, apiculate, bony, light brown, the lateral walls 0.2 mm thick, within smooth, dull; apical mesocarp of fibers and pith; basal mesocarp fibrous and fleshy.

HOLOTYPE: Papua, Isuarava, sec[ondary] forest, 3,500 ft alt, 3. 3. '36, *C. E. Carr* 15,922 (BM). Isotypes (K, L)!

DISCUSSION: *P. erythros* is a member of the section *Microstigma*, as is its closest relative, *P. Hollrungii* Warb. of Australian New Guinea, a species with the syncarp 35 cm long, 4–7 cm in diameter; drupes 11–13 mm long, the apex wide pyramidal; apex of the endocarp low convex; leaves at midsection with prickles of the margins 0.3–1 mm long, 1.5–3 mm apart, arcuate stout subulate, ascending. *P. erythros* has the syncarp 22–27 cm long, 4.5–5 cm in diameter; drupes 13–14.5 mm long, the apex narrowly pyramidal; apex of the endocarp conic; leaves at midsection with prickles of the margins 0.4–1.3 mm long, 1–3 mm apart, straight subulate, appressed ascending.

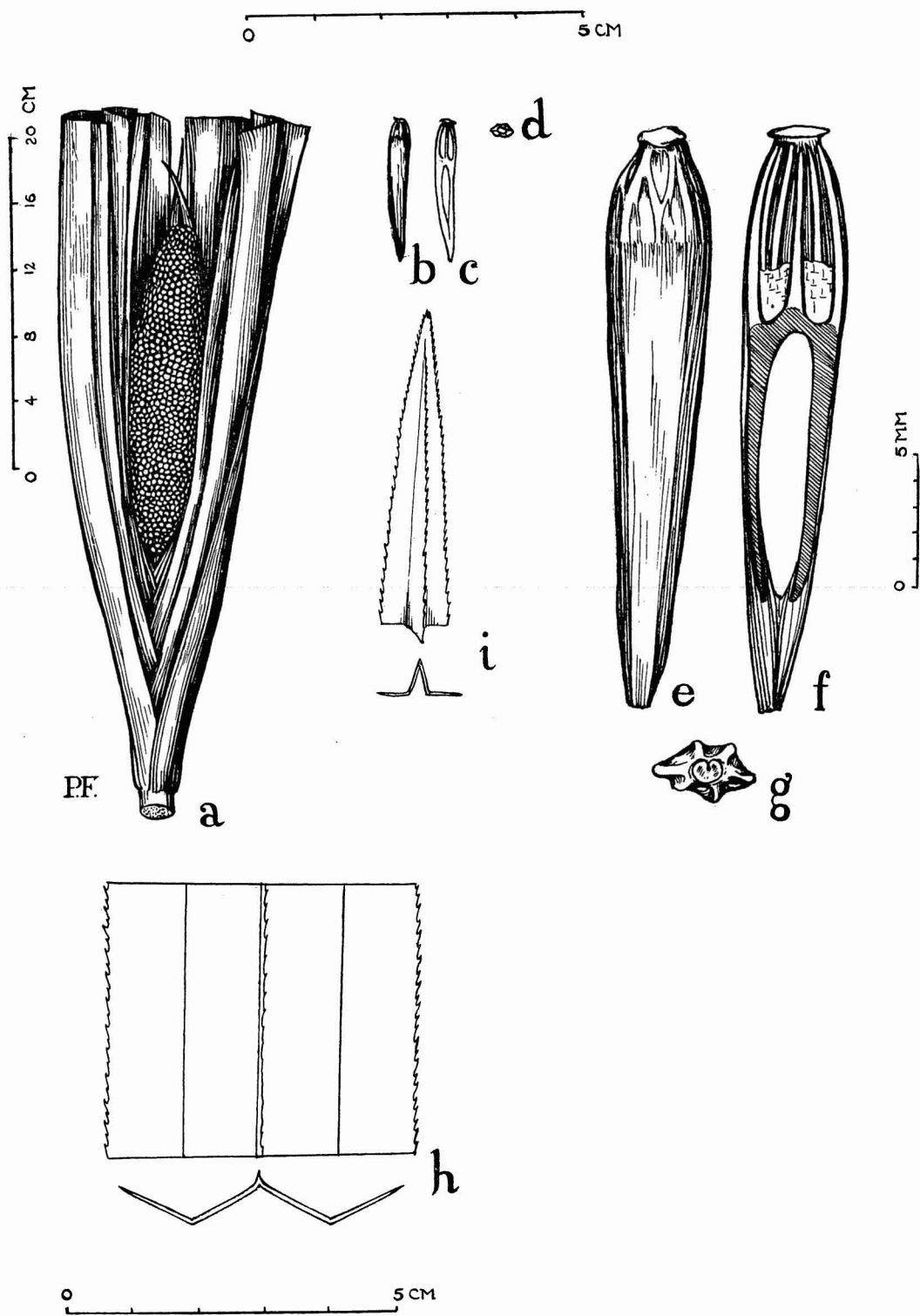
The new epithet is the Greek adjective *erythros*, red, and is given with reference to the orange-red fruit.

Pandanus plicatus sp. nov. (sect. *Microstigma*)

Fig. 274

NOM. VERN.: "gani."

DIAGNOSIS HOLOTYPE: Forma radices truncus et ramuli incogniti, basibus et mediis foliarum non conservatis, apicibus foliarum 39 cm longis preservatis 4.5 cm latis subtiliter coriaceis supra viridibus infra palliditer viridibus cum 48 nervis parallelis secundariis in quoque dimidio nervis tertiis reticulatis anguste oblongis formantibus, lamina ligulata V-sulcata 2-plicata in apice acuto diminuenti in sectione inferiori visi marginibus cum aculeis 2–4 mm separatis arcuatis crassiter subulatis adscendentibus biformatis alternantibus eis majoribus 0.7–1.3 mm longis illis minoribus 0.2–0.4 mm longis, midnervo infra angusto elevato et cum aculeis simulantibus biformatis 1.5–3 mm separatis eis majoribus 0.2–0.4 mm longis illis minoribus 0.1–0.2 mm longis, in apice marginibus et midnervo infra cum subulatis-serrulis 0.1–0.5 mm longis 0.5–1.5 mm separatis pallidis, infructescentia cum syncarpio solitario, pedunculo 17 cm longo, 12–15 mm diametro trigono foliosi-bracteato, syncarpio in seriebus tribus foliarum inclusis, bracteis exterioribus cum basi distenta lanceolata 9–10 cm lata syncarpio aequanti firme chartacea pallide lutea marginibus et midnervo infra minute spinosa apice folioso viridi ligulato, bracteis interioribus 23 cm longis lineari-lanceolatis, syncarpio 20 cm longo 6.3 cm diametro cylindrico cum drupis multis eis 20–22 mm longis 2.5–4 mm latis 2.5–3 mm crassis anguste prismaticis 5–6-angulosis rubris et licet omnino glutinosis parte $\frac{1}{4}$ supera libera ovoidea laevi lucida sed in sicco rugosa, stigmatibus 1.5–2 mm diametro apicali horizontali subcirculari obscure brunneo papilloso, endocarpio in parte $\frac{2}{5}$ infera osseoso rubri-brunneo tubu-



loso cum seta terminali lateribus lateralibus 0.2 mm crassis intra laevibus lucidis, semine 9 mm longo, mesocarpio apicali cavernoso cylindrico cum membranis longitudinalibus brunneis paucis, mesocarpio basali fibroso et carnoso.

DIAGNOSIS OF HOLOTYPE: Habit, roots, trunk, and branches unknown; leaf base and middle not preserved; leaf apex 39 cm long preserved, 4.5 cm wide, thin coriaceous, above green, below pale green, at the point 39 cm down with 48 parallel secondary veins in each half, the tertiary visible in outer part, forming narrow oblong meshes; blade apparently ligulate, V-sulcate, 2-pleated, narrowing to an acute apex, and at the lowest point the margins with prickles 2–4 mm apart, arcuate stout subulate, ascending, of two kinds alternating, the larger ones 0.7–1.3 mm long, the smaller ones 0.2–0.4 mm long; the nearby midrib below slender, elevated, and also with similar prickles of two types 1.5–3 mm apart, the larger ones 0.2–0.4 mm long, and the smaller ones half as long; at the apex the margins and midrib below with subulate serrulations 0.1–0.5 mm long, 0.5–1.5 mm apart, pale; infructescence with a solitary syncarp; peduncle 17 cm long, 12–15 mm in diameter, trigonous, leafy bracted; syncarp completely enwrapped by numerous foliaceous bracts in 3 series; outer bracts with an expanded, lanceolate base 9–10 cm wide, as long or longer than the syncarp, firm chartaceous, cream-colored, minutely prickly on margins and midrib below, bearing a foliaceous, green, ligulate apex, probably quite long, but not preserved; innermost bracts 23 cm long, 3 cm wide, slightly exceeding the syncarp, chartaceous, colored, linear lanceolate; syncarp 20

cm long, 6.3 cm in diameter, cylindric, bearing multitudinous drupes, these 20–22 mm long, 2.5–4 mm wide, 2.5–3 mm thick, narrowly prismatic, 5–6-angled, red, apparently mucilaginous throughout, upper $\frac{1}{4}$ free, ovoid, smooth, shiny, when dried rugose; stigma 1.5–2 mm in diameter, apical, flush, horizontal, subcircular, dark brown, papillose; endocarp in lower $\frac{2}{5}$, bony, reddish brown, tubular, with an apical bristle bending toward the stigma, the lateral walls 0.2 mm thick, within smooth, shining; seed 9 mm long; apical mesocarp a cylindric cavern with a few longitudinal brownish membranes; basal mesocarp fibrous and fleshy.

HOLOTYPE: Papua, Koitaki, wood by stream, 1,500 ft alt, 18. 6. 1935, C. E. Carr 12,590 (BM). Isotype (A)!

DISCUSSION: *P. plicatus* is a member of the section *Microstigma*, as is its closest relative, *P. rubrispicatus* St. John, of northeast New Guinea, a species with the drupes 14–16 mm long, 4–6 mm wide, oblance-prismatic, the upper $\frac{1}{4}$ free; endocarp median; leaves 3.3 cm wide, and at midsection with 26 parallel secondary veins in each half. *P. plicatus* has the drupes 20–22 mm long, 2.5–4 mm wide, narrowly prismatic, the upper $\frac{1}{4}$ free; endocarp in lower $\frac{2}{5}$; leaves 4.5 cm wide or more, and at the point 39 cm down with 48 parallel secondary veins in each half.

The collector recorded, "Fruit red. Eaten by natives after boiling for 1 hour."

The new epithet is the Latin adjective *plicatus*, pleated, and is given with reference to the pleated leaves.

FIG. 274. *Pandanus plicatus* St. John, from holotype. *a*, Syncarp and bracts, $\times \frac{1}{4}$; *b*, drupe, lateral view, $\times 1$; *c*, drupe, longitudinal median section, $\times 1$; *d*, drupe, apical view, $\times 1$; *e*, drupe, lateral view, $\times 4$; *f*, drupe, longitudinal median section, $\times 4$; *g*, drupe, apical view, $\times 4$; *h*, leaf section 39 cm from apex, lower side, $\times 1$; *i*, leaf apex, lower side, $\times 1$.